

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[PRICE 6D.]

of merchandise must be specified, to see the number of tons which
be carried usually from one extremity of the line to the other be

knows." Now, hitherto we have been unable to determine a priori what these amounts are—but we can tell with great accuracy what they have been on the different lines of railway now in operation. The following tables give the average of these expenses on several lines of railway—

MERCHANDISE TRAFFIC.			
Heads of charge.	Cost on railway per ton per mile.	Cost on the London and Manchester Railway.	Cost on the Great Northern Railway.
Locomotive power—wages and repairs ..	0.125	0.125	0.125
Wagon power ..	0.010	0.010	0.010
Conducting traffic ..	0.005	0.005	0.005
Maintaining railway ..	0.010	0.010	0.010
General expenses ..	0.005	0.005	0.005
Total cost ..	0.155	0.155	0.155

* Per ton per mile—in decimals of a penny.

PASSENGER TRAFFIC.			
Heads of charge.	Cost on railway per passenger per mile.	Cost on the London and Manchester Railway.	Cost on the Great Northern Railway.
Locomotive power—wages and repairs ..	0.125	0.125	0.125
Wagon power ..	0.010	0.010	0.010
Conducting traffic ..	0.005	0.005	0.005
Maintaining railway ..	0.010	0.010	0.010
General expenses ..	0.005	0.005	0.005
Total cost ..	0.155	0.155	0.155

* Per passenger per mile—in decimals of a penny.

Taking the Liverpool and Manchester Railway as an example, we find the number of passengers to average sixty per train. This may, on the whole, be considered as a fair average on all the railways throughout the country. Seven years working of the same railway gives as the average expense of locomotive power 0.125, or about 1d. per passenger per mile. The gradients do not exceed six or seven feet per mile, with the exception of the inclined plane, and this also is an average amount for most railways—in fact, fuel and wages are so nearly the same on all lines, that the expense of this head can be calculated with great exactness. The expense of locomotive power, also, is the only one which depends upon the gradients. The other expenses, which are independent of the gradients, are—conducting, maintaining, and general expenses, altogether amounting to 0.035, which, added to 0.125, = 0.160, or, in round numbers, three-fifths of a penny per passenger per mile for the expense of transport. Now, let us examine the relative expense of the merchandise traffic. We have, for the expense of locomotive power, 0.125, or, in round numbers, 1d. per ton per mile; for the cost of waggon and secondary expenses, 0.035, which, added to 0.125, gives 0.160, or, in round numbers, 1d. per ton per mile as the actual cost of transport. Now, let us mark the very striking result of this comparison. Even with all the most recent improvements, and cutting down every expense that can be reduced, the mere transport of passengers costs three-fifths of a penny per passenger per mile, whilst that of goods is only 1d. per ton for the same distance, and of this 1d. may be thrown out, arising from other sources, leaving the cost of transport—passenger, three-fifths of a penny per passenger per mile; goods, 1d. per ton per mile. In the first case, we have an amount exceedingly high, in proportion to the present means of transport, whilst the second case presents a result as strikingly low. A ton of goods is equivalent to the weight of fourteen passengers, with 30 lbs. of baggage each. When the loads to be carried are light, and the velocities at which they are carried considerable, the steepness of the gradients is a matter of comparatively little consequence, but as soon as the engine is loaded to its maximum power, the railway system becomes unable to compete with the canal, or for as relates to the carriage of goods. If these are the results offered to you by past experience, do you not see at once how it affects the question of laying out lines in remote districts, where but a small amount of traffic can be calculated upon? Again, referring to the table, with reference to the difference between carrying slowly and carrying quickly, we find that the expense of locomotive power on the Liverpool and Manchester Railway is 0.125, or nearly three-fifths of a penny, yet that the expense upon the Great Northern, where goods are carried at a moderate velocity, is only 0.035, and the remaining expense 0.035, so that it comes to this, that we have—Liverpool and Manchester Railway, 1d. per ton per mile; other railways, with moderate speeds, 1d. per ton per mile. Mr. Navier proposes a case not quite so strong, perhaps, as might be made out, and I will, therefore, refer to the Highland Railway for an example, the expense of which, for the first mile, has been about 2,000,000, or 10,000,000, per mile, the interest of which, at 6 per cent., is 120,000,000, which is the net receipt, after all expenses are paid, requisite to insure a decent interest to the shareholders. I shall not enter further into the question to-night, but if those students who are sufficiently advanced will take up the subject, they will soon be able to appreciate my arguments for increasing the limits within which gradients are usually kept—for, supposing the expense of carrying a passenger should be only 1d. per mile, yet, if you will calculate the additional expense of the interest of 10,000,000, per mile, you will find various results. Mr. Navier has said that the cost of transport is the chief point to be attended to in laying out a railway, goes on to determine the amount of power requisite to draw a given train over a given railway. The other students will, in connection with this subject, be aware of the opinion which has been pretty generally entertained amongst engineers, that a rise of twenty feet per mile is equivalent to a mile in length. Mr. Navier says—"Let us observe that, upon a horizontal line, the power required to draw a given weight is considered as being equal to almost the two-hundredth part of this weight," but, as I have shown in a previous lecture, the formula for the expression of this power will be,

power will be, taking F as the friction per ton, and n the number of pounds in each ton, so that what Mr. Navier calls the two-hundredth part of the weight will be friction divided by the number of pounds in a ton. Taking the friction at 9 lbs., we have $\frac{9}{200} = 0.045$ nearly. At 11 lbs., $\frac{11}{200} = 0.055$, and I must here repeat what I have on other occasions stated to you, that, although experiments have been made, which give us low a friction as 4 lbs. per ton, that, on an average, Mr. Navier is nearly right, when we take into consideration the numerous causes of friction. Mr. Navier considers the power required to draw a given weight "to be independent of the absolute velocity of transport, although there is reason to believe that the tractive power increases with the velocity." Now, it has been said that the friction is the same of all velocities. I cannot fully concur in this opinion. I think the absolute friction may be constant under all velocities, but that, from other causes, there appears to be, I will not call it an increase of friction, but an increase of resistance, the amount of which has not been satisfactorily determined. Mr. Navier says—"We conclude from this, that, in order to transport, with any velocity whatever, constant or variable, a weight, W , in a distance represented by s on a horizontal line, it is necessary to employ the power represented by $\frac{W}{200} \times s$ —that is to say, the power necessary to raise the weight to the height $\frac{s}{200}$." Now, in other words, to transport a weight any given distance on a horizontal line, is equivalent to raising it the two-hundredth part of that distance in vertical height; and, although this is not quite correct, it is sufficiently so for general purposes. We have before assumed that it is the same thing to go a mile round as to go over a hill rising twenty feet in a mile. Now, a mile being 1760 yards, or 5280 feet, we have $\frac{5280}{200} = 26.4$ as the power required, which is equal to raising the weight twenty-six feet. But, as the friction varies, I think we have sufficient experience now to say that in almost the same thing to rise thirty feet in a mile as to go a mile round; but there is quite independent of the question, whether you should or should not allow for one hand, and deduct on the other, when the slope exceeds the angle of repose. I have explained to you, on previous occasions, the difference of opinion that exists on this point. Both Mr. Navier and Mr. Navier allow the advantage up to a certain point, which they fix at about 1 in 100, beyond which point they consider the whole advantage gained to be destroyed by the necessity of pulling on the back. Now, in practice, we do not find this to be the case, unless we come to 1 in 10, or thereabouts; however, we must take, on a general rule, Mr. Navier's concluding words on this subject—

"The length of the line connecting the same, the amount of power consumed to effect the transport depends entirely upon the length of the line, and the difference of the level of its extreme points." The practical result which I have endeavored to lay before you this evening is, that the cost of transport in the cost of the power combined with the interest of the original cost of the line, and that the calculation of this combined expense must form the element of comparison between different lines of railway.

IRON TRADE.—Thursday was the day of meeting for the Iron Association. It has been usual for rather large sums to be paid on the occasion of such meetings. In the case of one firm reported to us, the amount was usually about 2000*l.*—on Thursday, this sum was paid in all 70*l.*—*Shipping.*

Large Iron Barge.—A shaft of wrought iron, weighing about sixteen tons, has just been shipped for the Great Western Steamship Company at Bristol, being, we understand, the largest piece of wrought-iron ever manufactured to this or any other country. It was manufactured at the Mersey Steel and Iron Works, Liverpool.

LAW INTELLIGENCE.

MR. NEILSON'S PATENT—LAW CHARGES.

NEILSON v. HARRISON.—This was a case to settle the liability of a witness in this case, it being alleged that the latter had adopted an erroneous course in "jumping" the travelling expenses of various witnesses together, and allowing 1*s.* per head per mile, whereas the actual outlay in respect of some had fallen short of that sum. When the motion was made it was intimated that an inquiry would be made from the taxing officers of the other courts, so that a general rule might be laid down for the guidance of the profession. The court accordingly, when this case was called on, without hearing Mr. Hunt or Mr. Richards, who appeared for the respective parties, announced that the result of the investigation instituted had led to a determination to make the rule absolute. The proper principle was, that 1*s.* per mile, and no more, should be allowed in respect of each and every witness whose expenses actually reached that point; but that where they fell short of that amount, then the allowance should be limited to the sum actually expended. There were, indeed, certain expenses of a general nature, such as a tavern bill, which might well be "brought into hotch-pot" and divided between the witnesses, but where, as in travelling, each witness must incur a separate account, the taxing officer ought to restrict his allowance to the costs actually incurred, observing the mileage of 1*s.* as the maximum.—The rule, therefore, was made absolute to review the taxation upon the principle above promulgated.

JOINT-STOCK COMPANIES—DIRECTORS' SHARES.

COURT OF COMMON PLEAS—APRIL 19.

DAVIDSON v. BOWER.—This action (reported in the *Journal* of the 9th inst.) was tried at the last Liverpool Assizes, before Mr. Baron Hall, and was brought by the plaintiff, the public officer of the Commercial Bank of England, to recover from the defendant, one of the directors of the bank, the value of a certain number of shares. The jury found a verdict for the plaintiff, damages 51*8*l.**

Mr. Serjeant CHANNELL now moved for a rule nisi to set aside the verdict, on the ground of misdirection, and also to arrest the judgment.—The Court granted the rule.

RIGHTS OF "LORDS" OF MINERAL PROPERTY.

COURT OF EXCHEQUER—APRIL 19.

THE MARQUESS OF ANGLADEY v. LORD HATMINGTON.—This action was tried at Worcester during the late assizes (reported in the *Journal* of the 12th ult.), involving the rights of the plaintiff, as lord of the manor, to the minerals, consisting chiefly of coal and lime, on certain estates held by the defendant under a copyhold tenure. After a trial, which lasted two days, a verdict was found for the defendant.

Mr. T. WILDE, on behalf of the plaintiff, now moved to set aside the verdict, and for a new trial on various points connected with the evidence adduced on the trial.—After hearing the learned counsel at some length, the Court granted a rule to show cause.

SHARE JOBBING—BRITISH WATERPROOFING COMPANY.

COURT OF EXCHEQUER—APRIL 21.

CURLEW v. HUNT.—This was an action arising out of some transactions with regard to shares in, we believe, what may be termed a defunct company—at all events, it was alleged that the company had given up its office, known some two years since by the title of the "British Waterproofing Company." The proceedings were instituted for an alleged breach of agreement. It appeared that, upon a particular occasion, the plaintiff had placed in the hands of the defendant a number of shares in this company, with instructions to the effect, that if he could sell them for him he wished him to do so, but that if he could not obtain 10*l.* for them, then the defendant agreed to return the plaintiff's own shares to him in three or six months. In the progress of time a formal application was made to the defendant for the return of fifty shares, which demand was complied with. On an examination, however, it proved that out of the lot there were two scrip papers for 50 shares each, which did not correspond, with reference to their numbers, with those which had been lodged with the defendant. For this breach of the agreement the action was brought, with a view to the recovery of the two missing certificates, as well as the recovery of compensation in damages for the injury alleged to have been sustained.—On the part of the defendant it was contended, that inasmuch as the scrip was deliverable property, and that the requisite number of scrip papers was handed over to the plaintiff, there could not have been any damage sustained. It was further shown that the office of the company had found their way into the Court of Chancery.

Mr. Baron GUMBY, in leaving the case to the jury, said, that inasmuch as the defendant had not returned the same certificates of shares or scrip to the plaintiff, and he had by his agreement contracted to do so, he had been guilty of a breach of such agreement. It was, however, for them to say whether, as the scrip was deliverable, and, therefore, that one certificate was equally good with another, there had been any loss sustained by the plaintiff. If they were of opinion that, under the circumstances, the plaintiff could have sustained an injury, it would be their duty to say to what extent, and then award a verdict accordingly.—The jury returned a verdict for the plaintiff—damages 10*l.*—In a second case a verdict was taken, by consent, for the plaintiff—damages 10*l.*, to be reduced on the delivery of other fifty shares in the same company.

BRITISH AND AUSTRALIAN BANK—MR. BOUCHER.

BAIL COURT—APRIL 25.

IN RE BOUCHER AND THE BRITISH AND AUSTRALIAN BANK.—The SOLICITOR GENERAL moved the court for a rule to show cause why Mr. Boucher should not pay to the British and Australian Bank the sum of 10,000*l.*, which, under an award in arbitration, had been declared due by him. The subscription to the reference had been put in an award in this case, and had been made a rule of court. Mr. Boucher should, therefore, under the 18th sec. of the 1st and 2d Vic., c. 119, have paid over the amount awarded, but, as he had declined to do so, this motion became necessary, in order to enforce the award by execution.—Rule to show cause granted.

BLAUNTON IRON AND COAL COMPANY.—On Friday, the 23d inst., a general meeting of the proprietors of the above company was held at the London Tavern, Bishopsgate-street, but we are unable to report the proceedings, as our reporter was refused admittance, this company, like many other similar companies, being anxious not to have the attention of the public directed to its management.

LIVERPOOL AND MANCHESTER RAILWAY.—At a special meeting of the proprietors of the above railway held at Liverpool, on Wednesday, the 29th inst., it was moved, seconded, and ultimately, after some discussion, carried by a large majority—"That the directors be and they are empowered to proceed with the negotiations and arrangements now pending with other companies and parties interested, and to take the necessary steps, by application to Parliament in the present session, for an extension of time for the purchase of land, should such a course be deemed expedient; and to enter into such contracts and do all such other matters and things as may be necessary or expedient for carrying into full effect and operation the formation and completion of the proposed Hunt's-bank junction line, in conformity with the report now received and approved by the meeting."

During the discussion it was stated that out of the five lines forming to Manchester, it had been determined to carry five of them to Hunt's-bank, which would then form a complete communication between the east and west coasts, and be highly beneficial to the interests of trade generally.

The cost of the proposed extension line will not exceed 250,000*l.*

RAILWAYS.—The royal assent was given last night, by commission, to the Midland Counties, the South-Eastern, and the Breckling Junction Railway Bills.

RAILWAY STATISTICS.—At a meeting of the Statistical Society of London, held on Monday last, Lord Bunsen in the chair, a paper on accidents upon railways by C. R. Weld, Esq., was read, by which it appeared, that between August, 1840, and December, 1841, 204 accidents occurred, by which 113 persons were killed, and 293 injured. Of the above number of accidents, 123 took place in the past year, and seventy-nine in the preceding five months, which is a decrease of exactly one-third. The number of persons carried by fifty railways amounted to 1,122,413, during the half-year ending July 1, 1841. It appears that a diminution has taken place in the number of accidents resulting from collision arising chiefly from mismanagement, or defective arrangements. A great proportion of the accidents that occurred at the end of 1840, and the beginning of 1841, were of this nature, so fewer than accidents actually having occurred in eight months, from August, 1840, to April, 1841, from the single cause of collision by trains or engines overtaking others travelling on the same line. During the nine months from April, 1841, to January, 1842, only five collisions of this nature occurred, and these, with one exception, unattended with fatal consequences. Altogether, the management of railways is so much better understood, that there is every reason to hope that accidents will ere long be of very infrequent occurrence.

THE COAL TRADE.—Mr. R. W. Brindley, chairman, and a deputation of the Coal Trade Committee, consisting of Mr. N. Ward, Mr. Hugh Taylor, Mr. Johnson, and Mr. Allmon, accompanied by Mr. Hodgson, M.P., Mr. Bell, M.P., and the Hon. H. Lubbock, M.P., had an interview with the Chancellor of the Exchequer on Thursday, at his official residence in Downing-street.

WELSH IRON WORKS.

A paper, entitled "Description of the Mills, Furnaces, and Furnaces of a Welsh Iron Work," contributed to the Institution of Civil Engineers, by Thomas G. Martin, Esq., C.E., after describing the general plan of an iron work, consisting of six blast-furnaces, four puddling-furnaces, and a large mill, capable of converting into bars the produce of the six blast-furnaces, enters very fully into certain alterations of the interior shape of the blast-furnaces introduced by him at the Blaenavon Works, from which have resulted an economy of fuel, regularity of work, and an improved quality of iron. The principal alterations appear to be, making the interior diameter greater above that at the bottom, and establishing a proper ratio between the diameter of the bushes and that of the charging place, and proportioning both to the height of the furnace. The opinions are supported by calculations of the quantity of blast used in smelting given quantities of ore, and the effect which the form of the furnaces must have in directing the current of the blast through the materials, by which also the point of fusion would be necessarily affected, and the chemical combinations varied. The particulars are then given of the construction of the furnaces at Blaenavon, and the details of the blowing-engines, blast mains, regulators, valves, &c., with calculations of the quantity of blast used in the various processes of the manufacture. The construction of the casting-houses, with the mode of ventilating by the iron roof, is detailed. The general arrangements of the balance pits, coke yards, waste kilns, and bridge houses, are shown, and the author proceeds to describe the forge and mill, which have thirty-five puddling-furnaces, with hammers, shears, rolls, and heating furnaces in proportion. He then condemns the usual practice of leaving the coupling boxes loose upon the spindles, as liable to break the rolls, shafts, or machinery, and gives the theoretical and practical reasons for preferring fixed couplings.—The communication was illustrated by three drawings, showing the general distribution and the details of an iron work.

After the reading of the paper, a discussion ensued, Mr. Lowe believed that there was an incorrectness in the statement of the iron, after being freed from its oxygen by the heat of the furnace, taking up a dose of carbon from the coke, thus becoming a carburet of iron, which is a fusible compound, and in such, fell melted into the hearth. On the contrary, he thought that the iron was combined with carbon in the ore, and that there was not any necessity for the medium of the fuel to charge it with carbon.

In reply to "Why the ore required, or why the iron carried away, any of the carbon of the fuel?" Dr. Faraday stated, that the ore being essentially a carbonate of iron, the first action of heat, either in the waste kiln or in the furnace, was to draw off the carbonic acid and leave an oxide of iron, and then the further action of the fuel (besides containing a high temperature) was to abstract the oxygen of the oxide, and so to reduce the iron to the metallic state, after which a still further portion of the carbon of the fuel combined with the iron, bringing it into the state of easily fusible or pig-iron. As carbon may be communicated to the iron in two ways, distinct in their nature, either by contact with solid carbon, as in the process of cementation (that by which steel is commonly converted), or from the carbonated gases, either carburized hydrogen, or carbonic acid, which occupy nearly every part of the air-way of the furnace, it would be desirable to distinguish, as far as may be in any furnace having a particular form or action, what proportion of the whole effect is due to the one mode of carbonisation or the other.

Mr. Wallace stated that the ore was a carbonate of iron, or a protoxide of iron and carbonic acid united, and not a carburet of iron (or iron and carbon simply), as was generally believed. In smelting, the carbonic acid was driven off, the simple oxide remaining; the oxygen of which, being carried off by the heat, left the pure iron, which, combining with the carbon of the coke, formed a fusible carburet of iron, or the pig-iron of commerce.

Mr. John Taylor observed that his brother, Mr. Philip Taylor, being unable of the advantages to be expected from the use of anthracite in smelting iron, made a series of experiments several years ago, from which he derived the opinion that the carbon absorbed by the metal, and which is necessary to produce it in the shape of pig-iron, must be precluded in a gaseous state (the mass in fusion); and as anthracite did not afford a sufficient supply of coal-gas during combustion to produce the proper effect, he proposed to adopt a very ingenious method, by which this gas would have been thrown into the furnace in such proportions as might be found necessary, mixed with the common air employed as the blast. Circumstances interrupted the course of these experiments, or it is possible that the use of anthracite for this important application might have taken place at a much earlier period than it has happened to do.

DOWLAIS IN 1841.

[From the Second, or unpublished, Volume of the *Railways of Great Britain and Ireland*, by Francis Whitlaw, Esq., Civil Engineer, M. Inst. C.E.]

There are few persons connected with railways who have not heard of the celebrated iron works of Sir John Guest, Bart., and Co., situated within a short distance of Merthyr Tydfil, Glamorganshire. The name of these works, and, indeed, of the surrounding village, which extends over nearly seventy acres, is Dowlais; the buildings constituting which are chiefly cottages, occupied by the numerous workmen engaged at this extraordinary establishment, at which so many of the edge-rails, with which both British and foreign railways are laid, have been manufactured. Of the forty acres occupied by the Dowlais Works, nearly seven are covered with the various buildings, furnaces, &c. The mineral property belonging to these works extends over and through nearly 3000 acres. There are eighteen blast-furnaces, capable of making 1600 tons of iron per week, which are blown by seven powerful steam-engines, two of which have 12 feet blowing cylinders and 9-foot stroke. The steam-power employed in the different operations is fully equal to 2000 horses, besides which there twenty water-balances for raising the coal and ore to the surface; there are also 300 horses, and seven locomotive engines, employed in carrying the iron, coal, and clinker, to their different destinations. The consumption of fuel, per twenty-four hours, is at present equal to 1100 tons, including that used for domestic purposes; the coal is not of a very bituminous description, but very firm and compact, giving out intense heat on being ignited, but the different veins vary considerably in quality and thickness; one of the veins is fourteen feet thick, and the rest vary from three to six feet in thickness. The principal veins of ironstone are below the coal, alternating with rock, clay, and shale; and below this is the limestone, which is obtained in large quantities from the crop. The population of Dowlais has more than doubled itself within the last twenty years. Some idea of the energy and enterprise of the owners of this splendid establishment may be formed, when we mention that it is only sixty-one years since the first bar of malleable iron was rolled at Dowlais. At present there are 4500 men, 3000 women, and 3000 children, dependent on these works for their subsistence. The wages of the colliers and miners average about 3*s.* per week; the fitters and puddlers earn each 3*s.*; the rollers and beaters 2*s.*; and the carpenters and smiths 2*s.* per week, respectively. The present amount of finished iron, manufactured at these works, is equal to about 420 tons of rails, and 450 tons of bars per week.

In the finishing process, the rails take double the time required to manufacture the bars, as they are reheated, re-rolled, and hammered; besides which, the ends have to be sawn off and filed, and the rails carefully straightened. In these operations great care and attention are required. The proprietors of these works have a method of refining the iron which differs essentially from that pursued at other works, and for which Sir John Guest has a patent. The improvement consists in raising the iron, in a fluid state, from the furnace into the refinery, instead of allowing it first to cast into pigs. In one of the mills were made, a short time since, 400 tons of rails, in the course of a week. The Taff Vale Railway, constructed with one set of rails throughout, with occasional sidings, and which work is particularly detailed in the present volume, will entirely supersede the tramways by which the produce of these works has hitherto been conveyed to the canal basin, a distance of ten miles; and the railway to Merthyr, a distance of two miles; the former of which has an inclination of about 1 in 300, and the latter of 1 in 100. The mode of working the Merthyr branch is by means of cogged wheels on the locomotive-engines, which work into the rack on either side of the way. The locomotives used on this rack have each an 8½-inch cylinder and 20-inch stroke, the pressure of steam being 45 lbs. on the square inch; the area of boiler is equal to 150 superficial feet, and the number of tubes is thirty. The velocity obtained on the rack, from Merthyr to Dowlais, is equal to three miles an hour, and the ascending lead to station time.

THE IRONWORKS.—One of those extraordinary animals of a former world has lately been restored by that indefatigable geologist, Mr. J. Buckman, and may now be seen at the Museum Hall. It is the fossilized remains of the ichthyosaurus, or fish lizard, in a very wonderful state of preservation. The skeleton measures nearly eight feet in length. The length of the centrum, or mouth, is fifteen inches, and is completely filled with perfect teeth. The orbit of the eye, which is very beautifully preserved, is five inches in diameter. It has 100 vertebrae, and the ribs are partially covered with what the discoverer is of opinion is the actual skin. The blocks of stone upon which the bones were found, are laid together in the case, exactly in the same relative position, which they occupied in the quarry, and joined together with cement. We are told that the weight of the apparatus and case is nearly half a ton. Altogether it is a grand and imposing object, and well worthy an attentive examination by the curious in fossil geology.—*Chesham paper.*

EXPORTATION OF COALS FROM PRINCE GEORGE.—On Sunday last, the *Albion* brig sailed from the port of Prince George with a load of coals for America. This is the first vessel which has been loaded for a foreign port at Prince George. On Monday, the *Rembrandt*, also loaded with coals, left the port, having been laden at Lytham.—*Princeton Chronicle.*

MEETINGS OF SCIENTIFIC BODIES.				
IN THE WEEK.				
SOCIETY.	PLACE OF MEETING.	DAY.	TIME.	NOTES.
Royal Geographical Society.	41, Waterloo-place.	Monday.	8 1/2 P.M.	
Medical Society.	41, Waterloo-place.	Monday.	9 P.M.	
Royal Medical and Chir. Soc.	85, Berners-street.	Tuesday.	8 P.M.	
Civil Engineers.	25, Great George-street.	Tuesday.	8 P.M.	
Zoological.	51, Pall-mall.	Tuesday.	8 P.M.	
Microscopical.	71, Regent-street.	Wednesday.	8 P.M.	
Society of Arts.	41, Abchurch-lane.	Wednesday.	8 P.M.	
Medical Botanical.	52, Backville-street.	Wednesday.	8 P.M.	
London Institution.	Finchley-circus.	Thursday.	12 P.M.	
Royal.	Somerset House.	Thursday.	8 P.M.	
Antiquaries.	Somerset House.	Thursday.	9 P.M.	
R. Society of Literature.	Martin's-place.	Thursday.	8 P.M.	
Naturalists Society.	Somerset House.	Thursday.	7 P.M.	
Royal Institution.	Albemarle-street.	Friday.	8 P.M.	
Westminster Medical.	Exeter Hall.	Saturday.	8 P.M.	
Mathematical.	Croft-street, Hyde-park.	Saturday.	8 P.M.	

PUBLIC COMPANIES.				
MEETINGS.				
South Eastern Railway.	London Tavern.	April 28.	1.	
Haytor Granite Company.	London Coffee-house.	May 1.	2.	
Pollock's Tin & Copper Mining Co.	41, Finchley-circus.	May 1.	3.	
Alston Mining Association.	54, Broad-street.	May 1.	4.	
Anglo-Mexican Mint Company.	9, New Broad-street.	May 1.	5.	
Barro's Gas Company.	29, Finchley-circus.	May 1.	6.	
Imperial Brazilian Mining Assoc.	London Tavern.	May 1.	7.	
Mexican Company.	27, Great Winchester-street.	May 1.	8.	
West Wales Jewell Mining Ass'n.	25, Threadneedle-street.	May 1.	9.	
Croydon Railway.	London Tavern.	May 1.	10.	
Imperial Continental Gas Ass'n.	7, White Hart-street.	May 1.	11.	
National Provincial Bk. of England &c.	51, Bishopsgate-street.	May 1.	12.	

NOTICES TO CORRESPONDENTS.

MINING IN IOWA.—We shall be glad to receive a copy of the "Report on the Mining Districts of the County of Iowa," and, if found, as our correspondents state, deserving notice, will receive every attention at our hands.

BRASS'S FOUNTAIN PUMP.—The communication on this subject is an advertisement, and can only appear as such in our columns.

WE SHOULD BE GREATLY OBLIGED to "W. R." or any other correspondent, for an account of the boring, and description of strata, passed through in the formation of the Artesian well at Plymouth.

"M. P." (Bristol).—The first ship, propelled by steam-power, that ever crossed the Atlantic, was, we believe, the *Robert Fulton* (built in New York), in or about the year 1819—certainly not the one mentioned by our correspondent.

SEVERAL REVIEWS are in type, and will be published, perhaps, in our next Journal.

"F. T. C." (Lancaster).—We should not advise our correspondent to publish a description of his invention, as such a course would prevent the securing of a patent, which seems to be his object—the expense of which is usually about £100. Apply to Messrs. Paine and Company, Lincoln's Inn, who will readily furnish further information, while any service we can render, in directing public attention to the principle, will be afforded with the greatest pleasure.

KITCHENWARE MINES.—It affords us pleasure to record the great information lately obtained as to the large class of Irish peasantry employed in mining pursuits in this country—whether that improvement be attributable to the "all-glutton case of Temperance," or to the more wise and discriminating judgment exercised by those who have the management of the mines. We do not, however, consider the statement of Captain Petre's of sufficient general interest to warrant us in giving it a place in our columns.

TO AUTHORS AND CARRIERS OF MINES.—The Editor will feel much indebted to Captains, and other Agents of Mines, who, by the transmission of specimens of ore, submitted to the Editor, will be enabled to give the most accurate and reliable information, with the view of placing them in a collection, now being formed, for the purpose of the classification of the several minerals of the various districts—attaching thereto such statistical information as can be acquired. Plans, or sections of mines, with particulars as to the direction and underlay of lodes, with notices of veins, even over-sea, fossils, &c., will be highly acceptable, and will be placed in cases, in which reference may, at any time, be made by the contributors. It is proposed, from time to time, to give papers, treating on particular districts, in the columns of the Journal, with an illustrative plan, or section.

THE MINING JOURNAL,

Railway and Commercial Gazette.

LONDON, APRIL 23, 1843.

We regret that it is out of our power to "report progress" on the proposed tariff, in which our readers are so immediately interested, but, having good reason to believe that we have nothing to hope—but all to fear, it behoves us to call the attention not only of the mine adventurer, but the working miner, to the fearful effects to be apprehended from the carrying of the measure. This course becomes the more necessary, from the evil which has attended the unequalled publication of the pamphlet of Sir CHARLES LEMON, who, we should think, has ere this, in common with the mining community at large, regretted that he should have so committed himself, and, at the same time, injured that interest which he has heretofore evinced the most earnest desire to advance.

We shall proceed to demonstrate the effects likely to be attendant on the measure, and, according to our usual practice, submit further "facts and figures," so that the question may be fairly considered, and no information kept in the back ground.

The following are the respective quantities of foreign ore sold at the ticketings in Swansea for the past twelve months, and also for the four months of the present year:—

Year.	Total.	Amount.	Average.
1841.			
Cuba Mines.	22,097	£341,543 10 0	£15 9 3
Sancti Spiritus.	7,830	129,731 13 6	16 7 0
Chili.	10,739	243,738 1 0	22 13 0
Other mines.	883	15,962 19 0	18 2 0
Total.	41,638	730,986 3 6	17 10 9
1842.			
Cuba Mines.	6,363	113,639 15 6	13 6 6
Sancti Spiritus.	5,469	98,949 3 0	18 7 0
Chili.	6,379	16,749 5 0	25 6 0
Other mines.	221	3,094 10 6	14 10 0
Total.	14,332	232,441 14 0	16 4 9

Comparing the sales of the first four months of the present year with those of 1841, the following will be found the results:—

Year.	Total.	Amount.	Average.
1841.			
Cuba.	7400	£123,574 5 0	£17 3 6
Sancti Spiritus.	3383	113,639 15 6	13 6 6
Chili.	1671	29,344 3 0	17 10 6
Other.	3469	36,948 3 0	16 7 9
1842.			
Cuba.	3073	68,935 12 6	22 3 0
Sancti Spiritus.	6379	16,749 5 0	25 6 0
Chili.	461	10,194 5 0	22 6 0
Other.	221	3,094 10 6	14 10 0

—thus showing a total for the months of January, February, March, and April, 1841, of 13,365 tons, yielding £20,149l. 4s., at an average price of 16l. 1s. per ton, and in the present year 14,303 tons, amounting in money to £22,441l. 14s., or 16l. 4s. per ton.

In offering such observations as appear to bear on the question, it will be sufficient, for our purpose, to deal with round numbers, and we, therefore, take the amount of sales for the past year at 730,000l.—of this 470,000l. was the produce of the Cuba and Sancti Spiritus Mines, which yielded dividends (besides the sums placed to the credit of the reserved fund) of 100,000l., or 13 per cent. on the gross amount of sales. If we take the Chili and other foreign mines in the same ratio, it will be manifest that a dividend in addition thereto was realized—making in all 240,000l., the amount of profits divided amongst the proprietors, which exceeded the surplus revenue of all the Cornwall mines for the past three years. As it is our object to show the effect which the influx of foreign ores must have on our home mines, taking into consideration not only the quantity and produce, but the low price at which they are

raised, and the vast profits yielded to the adventurers, it is only necessary for us to divide the amount of profits by the number of tons of metal smelted in bond for the past year (which, although only considered as an approximate, must be near the mark), to see at what rate the mines of Cuba and Chili could render copper in our home market.

The quantity of cake copper from foreign ores exported last year was 8488 tons, represented by imports of 41,638 tons of ore, which, assuming the ore imported to represent the cake copper, would give us an average produce of something about 20 per cent. Now, as 8488 tons of copper yielded dividends to the amount of 246,000l., it is clear that the profit divided is equal to nearly 30l. per ton on cake copper; and if to this we add the difference in price between copper smelted in bond and that of our home mines—viz., 8l. to 10l. per ton—it is manifest that the ores of Cuba and Chili could be rendered at 40l. per ton less on the price of cake copper than those of this country. This being proved, we have next to take into consideration the advantages which the foreign miner already possesses, and this is admitted on all hands to be at least 8l. 5s. to 8l. 10s. per ton on the charges of smelting, leaving out of note the further advantages attendant on the mixture of our Cornish, Welsh, and Irish ores with the rich produce of Cuba. These facts admitted, we consider the case to be clearly made out—viz., that the introduction of the produce of foreign ores into our home market (which is really our only protection), must be to destroy all property invested in our mines, and to throw tens of thousands out of employment.

What is the course pursued by Ministers, and what must be its effect? The foreign miner, we have shown, has not only the advantage of 8l. 5s. to 8l. 10s. per ton, in smelting his ore in this country, but he is enabled to sell his copper at 40l. per ton less than that obtained for British produce, without being subjected to a loss, and hence the home miner must either, on the introduction of foreign copper, meet the foreign miner in the market or stop his mines. It may be said that, with the large influx of foreign ores last year, our prices did not recede. To what cause is this to be attributed, it is well to inquire, and doing so we shall find that France was preparing for war, that her imports of copper for sheathing and other purposes were more than ordinary; that Russia, from whence she had her principal supply, has been unable to continue her exports not only from the increasing demand at home, but the alteration in their coinage, which having been called in on account of the question these adventitious circumstances, one thing is quite clear, that the produce of all the foreign ores smelted in this country in bond was exported, and sold at prices ranging from 8l. to 10l. per ton under that of home produce, and yet 250,000l. could be divided in the way of dividends—thus proving that the foreign mines could supply the foreign market, at reduced prices, while the miner at home was enabled only to support himself by the protection afforded him by the home market. It is now proposed to admit foreign copper here, and allow its use for home consumption, the result of which, we apprehend, must be to supplant the produce of this country. We do not object to the continuation of the system heretofore adopted, of smelting or even rolling foreign copper in bond, so that they do not interfere with our markets at home or our British possessions, for, we repeat, if foreign copper be once allowed in our home market, the mines of this country must go down. In such case, we would ask, what would be the consequence? We may, however, be told that no harm can result while our produce is 12,000 tons per annum, and that from foreign mines 8000; and, as was said by an intelligent correspondent ("R. W."), writing upon the subject in a late Number of the Journal, how can mines producing 8000 tons supply a demand of 20,000? and hence that our conclusions are erroneous. On this point we have only to refer to the sales of the past month, noticed last week, and to the encouragement which will be given to the foreign miner to bring over ores of lower produce, he having the wide margin, as we have already shown, of a profit of 40l. per ton.

With the knowledge we possess of the vast quantities of ore from 8 to 14 produce, which can be sent over from Cuba, thousands of tons lying at surface as "halvans," while tens of thousands can be raised at 10s. to 15s. per ton, it is not to be surprised at that we should contemplate the proposed measure of Ministers as one fraught with evil. Let but our mines be once abandoned, and we refer to those which yield the large produce, and worked at a heavy cost, from being deep mines—and then the foreign miner will keep up the price of copper, because he can supply the market as he pleases, and so govern the price, while there is no wholesome check afforded. It is hardly necessary to advert to spelter, which leaped from 12s. to 40s. per ton, or sulphur, from 4l. 10s. to 14l., and then reduced to 6l. when our own mines were put to work, to render this manifest to the most obtuse Minister or member of the legislative body, who are to determine on the protection to be afforded to the home miner. If, again, we take another view of it, and suppose that the copper can be rendered by the foreign miner—say, at 80l. per ton—we should find that 1,600,000l. would be the returns. Of this sum we will allow even 20l. per ton for smelting; thus 400,000l. would be expended in this country instead of the 1,600,000l., the value of the metal, and which 400,000l. expenditure we have the benefit of at the present moment, so that we should lose, as regards labour alone, in our copper mines, 1,200,000l.

There is another point which must not be lost sight of in the consideration of this question—that of the addition to our national wealth, arising from our mineral products. We may assume the entire mineral produce of this country at 20,000,000l. annually, the greater proportion of which is expended in labour; but, let us become dependent on foreign nations, and what is the result? We sustain a loss of not only 20,000,000l. annually, but are subjected to such tax or duties as the liberality of foreign Governments may, in their clemency, think fit to impose. We may, it is true, be told by the free trader, that, if the mines of Cuba and Chili can furnish copper to the manufacturer of 60l., 70l., or 80l. per ton, in place of 90l. to 100l., why should the miners enjoy a monopoly, whereby foreign copper is precluded from coming into our home market? Our reply to this is simple; the produce of our mines is, as already observed, an accession to our national wealth, while the numbers engaged in working them are at least 20 to 1 compared with those employed in the manufacture of the metal. Millions are embarked which must be sacrificed—the mines once abandoned cannot be resumed without a heavy outlay of capital, and serious delay in again putting them to work—the working miner being thrown out of employment, has no resource but the Poor Law Union—the country becomes dependent on foreign supply—and we send our money out of this country into foreign climes, to give employment to the slave; and, furthermore, the monies so sent away from this country go to enrich foreign nations, who take not our manufactures in return. We fear entering further on the question, but trust that what we have already said will have its due weight with those to whom our observations are more particularly addressed.

We now return to the point which we felt it our duty to introduce in our preliminary remarks—that of the working miner looking to himself, and not placing a reliance on those who should represent him, but who he will, we fear, find to be "traitors in the camp." It is, we feel, absolutely necessary that he should come forward, boldly claim, and endeavor to maintain, his rights. Having hastily sketched a form of petition, we hesitate not to submit it to the consideration of the miners, and, although far from being perfect, it may be the stepping-stone to some effusion of a

like nature from those who, feeling the effects of the measure already produced, and those to be calculated upon, are better able than ourselves to describe their position, and to judge of the language in which any memorial should be couched.

TO HER MOST GRACIOUS MAJESTY VICTORIA, QUEEN OF GREAT BRITAIN AND IRELAND.

The humble petition of your Majesty's faithful subjects employed in the mines of Cornwall, sheweth—

That the proposed measure of your Majesty's Ministers, whereby copper ore from the mines of Cuba and elsewhere, the produce of slave or foreign labour, is intended to be admitted at 25 per cent. on the metal contained in ores of less than 14 produce, and at 5 per cent. on ores exceeding such produce, is fraught with evil to all engaged in mines in this country, and, if pursued, must, in a great measure, if not totally, annihilate the mining interests of Great Britain.

That, in like manner, the proposed introduction of foreign tin at 6l. per ton, or 20s. per ton upon the ore, which is further reduced to 4s. per ton from British possessions, will have the effect of stopping the greater part, if not the whole, of the tin mines in Cornwall.

Your petitioners humbly submit, that these measures are wholly unequalled for, whether as regards the revenue contemplated by your Majesty's advisers, or the assumed advantages which are falsely calculated upon to arise to the manufacturer.

That at the present moment there are about 112 copper mines working—the number of persons employed being 8,500, in addition to which are the various tin mines, which afford employment to at least 17,000 individuals.

That the amount annually expended in labour alone may be estimated at 1,500,000l.

That the money so expended is disbursed throughout the mining districts, and affords the means of existence to numerous branches, besides those directly employed.

That at least 350,000l. is annually expended for mining materials, which gives employment to many thousands engaged in foundries, manufactories, and the carriage of ore, exclusive of the vessels employed in freighting the ores to Swansea.

That, with the view of diminishing the cost of working the mines, a capital of 200,000l. and upwards has been expended in constructing railways, to afford facilities for transport—the capital embarked in which must be lost if the mines be not worked.

That several hundreds of thousands of pounds have also been expended at Hayle, Portreath, Restronger Creek, and other ports, in the construction of quays and harbours, with stores, all of which must, in like manner, be sacrificed.

That your petitioners, if deprived of their present means of subsistence, have no other resource, and must be dependent on assistance for the support of themselves and families, arising from the legislative measure for affording relief to the poor.

That the wages of the miner who works underground, in many instances at a depth of 100 feet from the surface, for eight to ten hours in the day, and has, in addition, to undergo the fatigue of climbing ladders to and from that depth, have been reduced to 45s. to 50s. per month, which is inadequate to his support and that of his family—and that any measure calculated to further depress the present rate of wages must end in the abandonment of the mines.

That the increase in the imports of foreign ore is alarming, as shown by the following data:—The quantity of copper produced from the ores imported in 1837 was only sixty-six tons, amounting to 2000l., whereas, in 1841, it amounted to 8488 tons, or 34,000l., and for the past month the ore sold from Cuba and Chili alone was 41,638 tons, or 84,000l., and those of Cornwall only 11,332 tons, or 18,000l.

That, as your petitioners are informed and believe, the withdrawal of the drawback on timber alone will affect the mines to the extent of 80,000l. per annum.

That the introduction of the produce of foreign ores into the home market must of necessity, from the richness of the foreign mines, and the easy manner of obtaining the same, have the effect of stopping the mines of Cornwall.

That if the mines be so stopped, although only temporarily, they are not likely to be again resumed, and could only be done so at an extravagant cost of outlay and consumption of time—the deep mines yielding the largest produce.

That while the labour of 22,000 individuals is required in Cornwall to raise 100 tons of ore, or equal to 100 tons of metal, your petitioners are informed and believe that the same quantity can be raised in Cuba by fifteen to twenty individuals in the like time.

That the labour employed abroad is principally that of slaves, the price being about 25s. or 30s. a man.

That the number of persons engaged in copper smelting works of this country do not exceed 2000, while those in copper mines is upwards of 10,000.

That in the tin smelting works the number is less than 100, while those engaged in the mines is 16,000 to 17,000.

That your petitioners believe your Majesty's advisers to be in ignorance of the injury which the proposed measure is calculated to inflict on the community at large; and, moreover, that it is much to be lamented that your Majesty's Ministers did not avail themselves of that practical information which they might have readily acquired.

That your petitioners have good reasons to apprehend that parties interested in foreign mines have had an undue influence with your Majesty's Ministers, and that the late alteration in the tariff is solely attributable to such influence.

Your petitioners, in conclusion, humbly pray that your Most Gracious Majesty will not allow the proposed tariff to receive your Majesty's sanction—a measure which, if carried into effect, must have the effect of throwing out of employment upwards of 100,000 individuals in the county of Cornwall alone, who are employed directly and indirectly in working the mines, while little or no advantage is obtained by additional employment being afforded to any other class; and, further, that the revenue to your Majesty's Government must be insignificant, compared with the injury inflicted, and the loss that must be sustained in that arising from the taxation to which the country is at present subjected; and that should the tariff be carried, not only will millions of capital be sacrificed, but your loyal subjects will be reduced to beggary, and this country become dependent on supply from foreign nations.

We are aware that the conclusions at which we arrive may be said to be extreme—that our language is bold, and, perhaps, even more so in the opinion of some, and especially the Members for the county of Cornwall, than circumstances call for; but, it must be remembered, that our deductions are drawn from "facts and figures." We are no free trade visionaries, nor are we the advocates or supporters of measures whereby the adoption of a general plan should be destructive of an important interest, whether considered with regard to the capital embarked or the many thousands employed.

In conclusion, we may observe, there are good grounds for believing that the deputation from Cornwall have become alive to the serious injury which will be inflicted on the miner, and that they really mean to ask for a protecting duty of 10l. per ton. We can tell them they will not get it, and, further, that they have only to thank themselves (more especially Sir C. LEMON) for their pusillanimous conduct that it was not obtained in the first instance. Mr. Ald. THOMPSON, M.P., and some others, we believe, were "wide awake," and did not lose the opportunity of promoting the interests of foreign mines while the deputation were "dosing." We have, again, only to repeat that, in our opinion, the protective (?) duty will be no protection.

In another column will be found a notice of the late dreadful explosion of a "fire-damp" in the neighbourhood of Manchester, by which seventeen men and boys were killed, and several others dangerously injured. We have too much reason to fear, that many—very many, lives are sacrificed in that and other districts owing to the want of practical ventilation. A correspondent, writing on this subject from Newcastle, says—"I know too well the custom further south, where gross ignorance prevails; for instance, the surgeon, in this case, seem to have been the directors of operations in getting at the sufferers—no viewers appear to have been directing matters—so that between spirited and ignorant proceedings, even after an explosion, lives may be lost or gained—as the most of them are lost by the 'after damp' that ensues." Would it not, then, be well for some spirited officer to submit his colliery to the inspection of the more experienced northern viewer? we are quite satisfied that such course would lead to improvement; while it is quite shocking to think that human life should, to say the least, be constantly placed in imminent danger, when the application of known practical principles might be the means of rendering doubt and danger strangers to both owner and workman.

VICTORIA IRON WORKS.—The announcement of the sale of the Victoria Iron Works, belonging to the Monmouthshire Iron and Coal Company, by Mr. Haggart, at the Auction Mart, yesterday, attracted a large assemblage, who, however, manifested but little interest. The property was put up at 20,000l., and bought in at 74,000l., it being stated that 160,000l. had been expended. We should not be surprised to hear of other "plants and valuable machinery" coming into the market, but as we are not allowed to be present at the meetings of the Monmouth Iron Company (held yesterday), the Rhymney Iron, or the Cambrian Company, we regret we are not in a position to give such information as might see further light from being established by extraneous management and undue expenditure.

THE CORNWALL MINING INTEREST.—The agitation, occasioned by the late meeting of the mining interest at Redruth, are zealously ranged in London in endeavouring to obtain from the Government a higher protective duty for our ore than the now tariff proposes; but, from what we can learn, it does not appear that their prospects of success are very cheering. It is the opinion of some and well-informed men, that if the new tariff remains as at present, the tin mines of Cornwall will be ruined; and we, therefore, strongly suspect that some of the great miners, who carried themselves out on a tour of the last election, begin to feel that they have paid too dear for their whistle. The discovery is, however, made too late, and the ruin which Cornwall is threatened lies at the door.

Prices of English and Foreign Metals, on the usual credits, in London the first week in each month, for the past six years, ending December, 1841, showing the highest, lowest, and average price for each year:—

S P R I N G						
Year.	Jan.	Feb.	March.	April.	May.	June.
826. In bond, ton of 10	16	17	17	19	19	22
827. Ditto	16	17	17	18	19	18
828. Ditto	15	15	15	15	17	17
829. Ditto	19	21	20	21	19	16
830. Ditto	21	20	23	20	21	20
841. Ditto	23	23	25	26	27	29

Q U I C K S						
Year.	Jan.	Feb.	March.	April.	May.	June.
826. In bond, lb.	33	33	33	33	33	36
827. Ditto	33	33	33	33	33	37
828. Ditto	33	33	33	33	33	36
829. Ditto	33	33	33	33	33	33
830. Ditto	33	33	33	33	33	33
841. Ditto	33	33	33	33	33	33

BY J. J. WILKINSON, ESQ.

the operation is continued too long or too short a time, the ore is too brittle, and the quantity cannot be increased. Less copper is now exported from Mexico because the attention of the miners is directed to the gold mines. Mr. Teyler attributed the superiority of the quality of the foreign copper to the ore being smelted with charcoal; whereas English copper is smelted with bituminous coal, frequently containing sulphur.—*Trans. Inst. Civil Engineers*.

DIMENSIONS OF THE GREAT PYRAMID.—From an account of the labors of Col. Vyse and Mr. Perring, read at a late meeting of the Architectural Society, we find these gentlemen represent the original dimensions of the Great Pyramid near Giza on earth to be almost incredible. The pyramid was stated to have been 754 square feet at the base, and 489 feet of perpendicular height, covering 13 acres 1 rood 22 perches of ground, and could not now be built for less than 20,000,000*l.* sterling.

THE NEW TARIFF—FOREIGN ORES.

P.S.—I would advise Mr. Turner to return to the Board of Trade office, and state his willingness to withdraw his opposition to the reduced duty on ores below 14, provided an additional 7½ per cent. be laid on all above 25.

TO THE EDITOR OF THE MINING JOURNAL.

<i>Rule.</i> —To 500 + 200.....	700
Deduct for pumping (friction) one-fifth....	140—500 lbs. lifted
forty feet high by the gyration of one-half of a revolution, or 1120 lbs.	
lifted forty feet high with 4000 lbs.	
An author on hydraulics says—"Power may always be safely derived from a water-wheel at about one-fourth of the radius from the circle."	
<i>Rule.</i> —48 feet × 3.1416	153,664 circumference.
One-half	62,832 radius.
One-fourth	15,708
Deduct for pumping (friction) one-fifth	3,141—12,567.
<i>Answer.</i> —As 12½ is to 48, or 126 lbs. lifted forty feet high with 4000lbs.	

I have had several wheels erected for pumping water and for other purposes, and have invariably found these calculations to be near the truth. The most satisfactory way that I have found for proving the power accurately is by pumping water, but then the losses or plungers applied for that purpose should be in good working order, and the water pumped up should not only be measured by the area of the cylinder or piston and length of the stroke, but also proved by measuring the stream discharged at the head of the lift, by having a small cistern or some other vessel prepared for the trial.

The mode of measuring running water by width, depth, and time is not a satisfactory way, although it is a common practice as a rough guess. The water may also be measured by the contents of each bucket, and counting the number.

I have now two mills working a manufactory, but at present have no pumping wheel of work. I am in course of erecting a new wheel, and if more power than what is stated in the foregoing can be obtained, I should be thankful if some of your readers would point out the means. A quick plain way for me now to calculate (making allowances for friction) is a little more than 1 in 4; or, should the wheel be well constructed, and very near the mine shaft, may come nearly as 1 in 3—and not, on your Blackleigh correspondent says, 5/2 of the expense of 953, or nearly as 2 to 1. I doubt his rig is to the mine he assumes ("A Miner"). A miner, either as a bargain taker or a bargain letter, should know something of calculation.

The parties who raised in many objections against you about the time you first commenced the publication of your Journal, would sometimes misapprehend the safety by calling one fair or six, and, in some instances, ten or more, but, through your weekly remarks and exposures, it is now become hard work for even "A Minor" to make the public believe that one is two.

Vale of Edward, April 17. W. WHEELER.

STEAM ENGINES & WATER WHEELS.

Sir.—I agree with your correspondent, B. Dismore, wherein he says that I am an exceedingly bad writer—and that my sole English and confused collaboration may have made him mistake my meaning. I have no doubt, for it appears he has not taken any notice of the construction of the balance-lets on the cranks, but has misunderstood it entirely, because he does not understand it; and, tyrant-like, because I did not conform to his will, he would annihilate me with his big words. That the cranks being laid at right angles, without connecting balance-lets, would be a drawback, instead of an improvement, I allow; but your correspondent's remarks against the idea, I pronounced have not yet convinced me that it

METALLIFEROUS DEPOSITS OF SICILY

REJECTION OF THE CONCEPTION OF IRON SAYS TWO AMERICAN SCIENTISTS.—Mr. Tingell, of North Abber, says he has found that iron mixed with one-third its weight of quick lime, and then heated and cast, contracts iron in a surprising manner from the action of sea-water.

